What is claimed is:

1. An embolic coil comprising:

an elongated core element formed of a shape memory material treated to define a memorized secondary coil shape; and

an elongated outer element wound around the elongated core element to define a primary coil shape of the embolic coil.

2. The embolic coil according to claim 1, wherein the shape memory material of which the elongated core element is formed is, at an operational temperature of the embolic coil, in an austenitic phase.

3. The embolic coil according to claim 1, further comprising a plurality of fibers extending therefrom.

4. The embolic coil according to claim 3, wherein the elongated outer element is adapted to retain the plurality of fibers attached to the embolic coil.

5. The embolic coil according to claim 1, wherein a shape of the primary coil is defined by applying cold work to the elongated outer element.

6. The embolic coil according to claim 1, wherein the memorized shape of the elongated core element is substantially a coil.

7. The embolic coil according to claim 1, wherein the memorized shape of the elongated core element is substantially a three dimensional spiral.

8. The embolic coil according to claim 1, wherein the shape memory material of which the elongated core element is formed includes Nitinol.

9. The embolic coil according to claim 1, wherein the elongated outer element is formed of platinum.

10. The embolic coil according to claim 1, wherein the primary coil shape is a substantially cylindrical coil.

11. The embolic coil according to claim 1, further comprising a plurality of fiber retention grooves formed on the elongated core element.

12. The embolic coil according to claim 1, wherein the elongated outer element comprises a platinum wire co-wound with a wire formed of a shape memory material.

13. A method of forming an embolic coil, comprising the steps of:

imparting a memorized shape to a core element formed of a shape memory material, wherein the memorized shape defines a secondary coil of the embolic coil;

straightening the core element;

winding an elongated outer element around the straightened core element to form a primary coil of the embolic coil; and

releasing the straightened core element when the device has been positioned at a deployment location to form the secondary coil of the embolic coil.

14. The method according to claim 13, further comprising the step of attaching fibers to the embolic coil.

15. The method according to claim 14, wherein the fibers are attached to the primary coil.

16. The method according to claim 14, wherein the fibers are attached to grooves formed in the core element.

17. The method according to claim 13, further comprising the step of cooling the shape memory core element below a critical temperature before straightening the core element.

18. The method according to claim 13, wherein the core element is released in an environment having a temperature above a critical temperature of the shape memory material.

19. The method according to claim 13, wherein the secondary coil shape is one of a spiral, helix, vortex, and three-dimensional spiral.

20. The method according to claim 13, wherein the elongated outer element is formed of a platinum wire.

21. The method according to claim 20, further comprising the step of co-winding the platinum wire with a wire formed of a shape memory material.

22. The method according to claim 13, wherein the core element is formed of a Nitinol wire.

23. The method according to claim 13, further comprising the step of forming fiber retention grooves in the core element.

24. A coiled medical device for implantation in a patient comprising:

a primary coil having a primary coil shape, the primary coil defining a lumen extending therethrough; and

a secondary coil formed of a shape memory material and disposed in the lumen, the secondary coil having a secondary coil memorized shape, wherein, when heated to a temperature above a critical temperature of the shape memory material, the secondary coil causes the primary coil to follow the secondary coil shape.

25. The medical device according to claim 24, further comprising fiber-like elements attached to the primary coil.

26. The medical device according to claim 24, wherein the shape memory material includes Nitinol.